#28 Appeal Brief 2/8/04

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Examiner: **Thomas J. Druan, Jr.** Serial Number: **09/708,658**

GAU: **3724** Applicant: **Nick Bromer**

Filed: **November 9, 2000** This paper submitted: **February 18, 2003**

Confirmation No.: **3157** Title: **BLADE WITH MICROSCOPIC ...**

APPEAL BRIEF

Commissioner for Patents

P.O. Box 1450, Alexandria, VA 22313-1450

S i r :

This paper is in response to the final Office Action mailed on November 21, 2003. A Notice of Appeal is submitted herewith. An earlier Notice of Appeal was filed on February 3, 2003, with fee, and no fee is due now for the attached Notice of Appeal.

REAL PARTY IN INTEREST

Nick Bromer, the Appellant, is the real party in interest.

RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

STATUS OF CLAIMS

Claims 1-6 are pending, rejected, and appealed. Claims 7-16 are canceled.

STATUS OF AMENDMENTS

All amendments since the Final Office Action of November 21, 2003 have been entered.

SUMMARY OF INVENTION

Claim 1 recites

1. A blade, comprising:

a substrate including a specular surface, wherein at least some reflected image is visible on the surface;

The substrate (Fig. 2) optionally has two parts 10 and 12 (recited in claim 2). The substrate can be metal as in the usual blade, or glass (recited in claim 4, and described at page 10, line 18 in the specification). Glass, like metal, is a known blade material. But unlike prior-art blades, one side of the Appellant's blade is specular (i.e., polished like a speculum or mirror), so that a reflected image is visible in it (page 5, line 12 in the specification). As is explained below, the specular feature is what provides an advantage when the blade is coated with the thin, hard layer 20. Fig. 2 shows that the surface of the hard layer 20 is microscopically smooth and therefore specular, because it lies on top of the specular surface of the substrate 12.

Fig. 1 shows the prior art, in which the surface is not specular, but rough (on a microscopic scale).

The specular feature is set out in the specification at page 10, lines 16-24; the roughness of the prior-art blade, which is produced by ceramic-coating a rough-ground, non-specular blade, is discussed at page 3, lines 13-20. Claim 1 continues,

> *and a thin plate deposited on the specular surface, the plate comprising a plate material that is harder than the substrate;*

The plate, 20 in Fig. 2, will typically be a vacuum-deposited ceramic, such as titanium nitride, or synthetic diamond (page 16, line 24). Knives and tools are often coated with such ceramic because it is both harder and more slippery than metal, so that sharpness is retained and cutting is easier. (The Appellant's prototype blade, which was demonstrated to the Examiners, was coated with ceramic at a local company specializing in such coatings.) These coatings are very thin, as is mentioned in the specification at page 3, line 5. Because the coating is thin and uniform, the blade remains specular after the coating is applied. Claim 1 continues,

> *wherein the substrate is beveled toward a cutting edge of the blade; and*
>
> *wherein the cutting edge comprises the plate extending to the cutting edge on a single side of the blade;*

The feature above is shown in Fig. 2. The cutting edge, where the bevel ends, includes the edge of the hard plate 20, shown on the upper side in Fig. 2. This feature occurs spontaneously when the blade is sharpened on the non-specular lower side.

Claim 1 continues,

whereby the cutting edge is straight in a cutting direction.

This final paragraph of claim 1 explains why the specular surface is important. When the surface is rough, the thin, hard plate 20 is convoluted as in Fig. 1, and therefore the cutting edge, as seen along the direction of A, is wavy (see Fig. 3 and the specification at page 4, lines 6-11). This has the disadvantages discussed in the specification at page 2, lines 1-17.

In contrast, Fig. 4 shows the same view of the plate atop the Appellant's specular substrate (page 9, line 7), which is straight (page 11, lines 18-24) and remains straight even when the blade is sharpened on the opposite side (page 12, lines 18-25). This straightness is an object of the Appellant (page 2, lines 15-17). It makes the blade sharper (page 5, line 17), because the thin, hard plate 20 acts as an efficient cutting edge, going straight into the material being cut (page 12, lines 24-25) and presenting a minimal length. The ceramic layer also undergoes less stress (page 15, lines 17-25).

Dependent claim 2 recites that the substrate comprises

a base portion including a first material and

a surface portion including a second material that is harder than the first material and less hard than the plate material, wherein the surface portion comprises the specular surface.

The Appellant's prototype used stainless steel for the first material and hard chromium plating for the second material. Chromium is disclosed in the specification at page 11, lines 5- 8, and is recited in claim 3. Glass is an alternative for the second material, and is disclosed at page 14, line 5.

Claim 5 recites that the plate material comprises a ceramic (page 10, line 16), and claim 6 recites that the plate has a thickness on the order of a micron (page 12, line 16).

ISSUES

(1) Whether claims 1 and 6 are anticipated by Gerber USP 4,653,373, earlier cited and now applied.

(2) Whether claim 5 is obvious over Gerber in view of Warner USP 5,077,901.

(3) Whether claim 2 is obvious over Gerber in view of Ignatieff 1,607,083.

(4) Whether claims 3 and 4 are obvious over Gerber in view of Ignatieff and Wexler 5,630,275.

GROUPING OF CLAIMS

The Appellant requests consideration of claim 1.

ARGUMENT

Claims 1 and 6 were rejected as anticipated over Gerber '373. Also applied, but not cited, is page 703 of *Machinery's Handbook*, 26th Edition. The Appellant respectfully traverses this argument on several grounds:

(1) Claim 1 recites

> ... a substrate including a specular surface, ... a thin plate deposited *on the specular surface* ... wherein the substrate is beveled toward a cutting edge of the blade; and *wherein the cutting edge comprises the plate extending to the cutting edge* ....

It follows from the italicized language that the specular surface is not the surface that is ground to sharpen the blade. If the side with the specular surface and plate (in Fig. 2, the upper side) were ground to produce the bevel, then the claimed cutting edge would include only the substrate 10, 12 and would *not* include the plate 20. The Applicant's specification describes the advantages of having the hard plate located at the cutting edge, as claim 1 recites.

In Gerber the plate is the "wear resistant coating 32" (Fig. 2 and col. 3, line 11). Gerber sharpens the side of the blade opposite to the coating 32, using

the grinding wheel 43 shown in Fig. 5. The Examiner asserts that the grinding wheel 43 produces a specular surface, which is believed incorrect (this is discussed below); but even if it *did* produce a mirror surface, it still would not produce a specular surface under the hard plate, and that is what the Appellant claims. Gerber grinds the side of the blade opposite to the surface coating—this is clearly shown in Fig. 5. Thus, Gerber would not anticipate even if the wheel 43 did produce a polished surface.

(2) The Appellant doubts that discloses a specular surface on the side opposite the coating 32. Gerber states that the grinding wheel 43 is made of either "coarse" or "fine" grit (col. 4, line 49). When coarse grit is used, the result (see Fig. 6) is "Scores 45, 45 [which] cause the cutting portion to have an uneven thickness [and] yields a more jagged or serrated cutting edge" (col. 4, lines 63-67). Clearly, the coarse grit does not produce a specular surface.

There is little description of what surface the fine grit produces; Gerber only states that when using the fine-grit wheel, the blade should be reciprocated in order to achieve a "smooth" surface (col. 4, lines 49-2), suggesting that the surface will not be "smooth" if the blade is held steady.

The Appellant submits that the "fine" grit wheel cannot be assumed to produce a specular surface, when the only fair comparison is to a coarser wheel that causes "jagged" serrations. There is no teaching in Gerber that the wheel 43 has anything other than grit within the ordinary range of sizes for sharpening,

and ordinary grinding wheels do not produce a specular surface, and is well known.

(3) The Examiner asserts that "The surface [of Gerber] is made specular by use of a grinding wheel ... grinding creates a roughness as small as 500 Angstroms according to the included Roughness Height Table" (page 2, line 13). The Examiner is understood to assume that Gerber's grit is at the extreme fine end of the range of grit sizes, i.e., 500 Angstroms. However, even if a full spectrum of grit sizes were disclosed or suggested by Gerber (which is not the case), there would still be no reason to assume that the reference teaches one end of that range. Gerber does not teach against either its "coarse" or "fine" grinding, and therefore does not suggest moving toward the fine end of a range.

(4) The Examiner's assertion is based entirely on the Roughness Height Table, which is a table taken from Machinery's Handbook. This table purports to show that grinding produces a roughness as fine as 250 Angstroms[1] "AA" (presumed to stand for "Arithmetical Average"). According to the graph extrapolated from Bennett and Mattsson (IDS of April 23, 2003), this is just

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[1]This table provides two units, "Metric" and "Micro", which apparently refer to micrometers ("Metric") and microinches ("Micro"). This can be inferred from the relative sizes and the conversion that 1.0 inch = 2.54 cm = 25,400 μm, from which it follows that one microinch equals 0.0254 μm, which is verified by the next-to-last set of numbers on the right side of the column headers in this reference, reading "0.025" and "(1)," which mark the smoothest extreme of Grinding and Honing according to this reference. This extreme of 0.025 μm is equivalent to 254×10^{-10} m = 250 Angstroms.

within the range of specularity (assuming that "AA" is not too different from the rms measure of Bennett and Mattsson). But the Appellant respectfully submits that the applied table does not *definitely* show that grinding can produce a specular surface. First, the table is crude, giving results only within a factor of 2—the honorable Board is invited to note the doubling in each column—and one is left to guess whether the actual roughness limit is closer to 1, or to 2, microinches. Second, there is no support for or explanation of the results.

Respectfully submitted,

Nick Bromer

Nick Bromer
[Registration No. 33,478]
(717) 426-1664, voice and fax

Address: 402 Stackstown Road
Marietta, PA 17547

APPENDIX: CLEAN VERSION OF CLAIMS

1. (original): A blade, comprising:

a substrate including a specular surface, wherein at least some reflected image is visible on the surface; and

a thin plate deposited on the specular surface, the plate comprising a plate material that is harder than the substrate;

wherein the substrate is beveled toward a cutting edge of the blade; and

wherein the cutting edge comprises the plate extending to the cutting edge on a single side of the blade;

whereby the cutting edge is straight in a cutting direction.

2. (original): The blade according to claim 1, wherein the substrate comprises

a base portion including a first material and

a surface portion including a second material that is harder than the first material and less hard than the plate material, wherein the surface portion comprises the specular surface.

3. (original): The blade according to claim 2, wherein the second material comprises chromium.

4. (original): The blade according to claim 2, wherein the second material comprises glass.

5. (original): The blade according to claim 1, wherein the plate material comprises a ceramic.

6. (original): The blade according to claim 1, wherein the plate has a thickness on the order of a micron.

7-16. (canceled)